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A HEARTH OF THE POLISHED STONE AGE.*

ON the summit of a steep hill between the valley of the Bas Roches and that of the Dheune, overlooking the immense plain of the Saône, and commanding a view of the Jura, the Alps, and the mountains of the Maconnais and the Morvan, and surrounded by numerous other camps, is the camp of Chassey, which occupies an area of about eight hundred yards in length by a breadth varying from about one hundred to two hundred yards. So commanding and important a spot was not only taken possession of by the Romans for a *castellum*, and by the Gauls for an *oppidum*, but was also occupied in prehistoric times. Several collections of antiquities belonging to different periods have been formed upon the spot, but it was reserved for M. Perrault to make the interesting discovery which he has recorded in so simple yet so complete a manner in the pages now before us. A terrace, sheltered by rocks from the north and east winds and facing the morning sun, seemed to him well adapted for early habitations, while a depression in the ground in front proved, on examination, to contain the remains of a large hearth, or it might be termed kitchen, and here he instituted excavations.

Beneath a few inches of soil he found a bed rather more than two feet in thickness, made up of ashes, bones, and pottery, and containing numerous instruments of various kinds. The whole reposed on a platform of rough slabs of stone, blackened like the soil beneath them by the action of fire. Not a trace of metal was discovered, and in describing the objects found, M. Perrault divides them into (1) instruments of stone, (2) those of bone, and (3) pottery.

Exclusive of fragments, some one hundred and fifty stone instruments were found, consisting for the most part of hatchets, arrowheads, flakes, borers, scrapers, hammers, mealing stones and polishing stones. No less than eight perfect stone hatchets were found, as well as fourteen broken, and of those that were uninjured two were still mounted in stag's horn sockets, similar to those with which the discoveries in the Swiss Lake dwellings have made us so well acquainted.

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* We copy from *Nature* of Jan. 19th the following interesting summary of a recent work by Ernest Perrault, entitled "Note sur un Foyer de l'Age de la Pierre polie decouvert au Camp de Chassey en Septembre, 1869." 1870. 4to. pp. 32, and 8 plates. London: Williams and Norgate.

Only two are of flint, and one of fibrolite, the others being of chloromelanite, serpentine basalt, and diorite. They seem to have been formed from pebbles brought down by the Saône, and it is interesting to observe that the same process of manufacture was in use in this part of Burgundy as in Switzerland, the splitting of the pebbles into the required form having been partly effected by sawing. That some of the spare hours of those who frequented the hearth were employed in preparing their hatchets is proved by the large number of grinding or polishing stones, of which, counting fragments, upwards of sixty were present. M. Perrault regards one of the smallest of the cutting instruments, a little triangular celt, as a religious emblem, but it seems more probable that it was used as a hand-tool, like a chisel, of one of which the sharpened end was also found.

The arrowheads of flint, twenty-three in number, present a variety of forms, leaf-shaped, triangular, lozenge-shaped and tanged, the latter both with and without barbs. Their general aspect is such as might have been expected from the locality, most of the forms occurring also in Switzerland. There are, however, one or two shaped like small hatchets, with a broad, sharp base, formed by the original edge of the flake from which they were made, and rounded, or truncated at the other end. It is stated that this sharp edge was intended for insertion in the wood, but more probably it was the other end that was thus secured, and the arrows were, so to speak, chisel-pointed, like the flint-tipped arrows which survived in use, probably for fowling purposes, after metals became known to the ancient Egyptians. Similar arrowheads, if such they be, have been found in considerable numbers in Sweden, and a few in Denmark, as well as in some other parts of France. It seems by no means impossible that some of the sharp-based instruments from the Yorkshire Wolds may have served a similar purpose.

The mealing stones consist of a large block, usually of hard sandstone or porphyry, and a smaller stone as muller, and are of the same character as those still in use in Central Africa. They must have been gradually eaten together with the flour they produced, and no doubt tended to promote that wearing away of the crown of the teeth, so common in ancient times. None of the grain has been found, but probably most of the cereals known to the old Swiss Lake dwellers were also known at Chassey.

The objects in bone and horn are almost identical with those from the earlier Swiss Lake dwellings, and consist of the sockets already mentioned, awls, chisels, etc. The pottery, which is extremely fragmentary, is much of the same character as the Swiss. It has been ornamented both by punctured dots and by a sort of pillar moulding, as well as by incised lines. In one instance there seems to have been an attempt to represent the outline of a boar by lines scratched in the clay when still moist. In another, the ornament consists of bands of triangles alternately cross-hatched and plain, a style more in accordance with the bronze age than with that of stone. Most of the pottery seems to have been adapted for suspension. The number of small ears or handles found exceeded two hundred. A few spindle-whorls and beads were also found, but the most curious objects are the spoons, exactly similar in form to those of wood in common use in our kitchens at the present day, but formed of clay. It is true that several wooden ladles and at least one earthenware spoon were found in the settlement of Robenhausen, but one can hardly repress a feeling of surprise at finding the spoon so fully and completely developed among a people apparently unacquainted with the use of metal, though it is true that they appear to have had the materials for porridge at their command.

In concluding this short notice of a valuable contribution to prehistoric archæology, a regret must be expressed that the animal remains discovered in the refuse heap have not, apparently, as yet been submitted to proper scientific examination, so as to determine the species, and which of them were domesticated, though some human remains from neighboring tumuli and interments are reported on by Dr. Pruner-Bey. The animals whose bones occurred are described as the ox (possibly domesticated), pig, stag, sheep, goat, and horse, which is rare. The bones are not always broken, and the vertebræ occasionally occurred in juxtaposition, as if meat at times had been extremely abundant. There is no mention of any remains or traces of dogs, and this condition of the bones seems to afford an argument in favor of their absence, which, if established, would be a remarkable fact. Some teeth of reindeer are mentioned as having been found on the plateau, and it would be of great interest to ascertain their relation to the other remains. Let us trust that ere long there may again be a season in France when a thought may fairly be bestowed on other camps and other earthworks than those on which attention is now so unfortunately concentrated.

BRISTLE-TAILS AND SPRING-TAILS.

BY A. S. PACKARD, JR., M.D.

THE Thysanura, as the Poduras and their allies, the Lepismas, are called, have been generally neglected by entomologists, and but few naturalists have paid special attention to them.* Of all those microscopists who have examined Podura scales as test objects, we wonder how many really know what a Podura is?

In preparing the following account I have been under constant indebtedness to the admirable and exhaustive papers of Sir John Lubbock, in the London Linnæan Transactions (vols. 23, 26 and 27). Entomologists will be glad to learn that he is shortly going to press with a volume on the Poduras, which, in distinction from the Lepismas, to which he restricts the term Thysanura, he calls Collembola, in allusion to the sucker-like tubercle situated on the under side of the body, which no other insects are known to possess.

The group of Bristle-tails, as we would dub the Lepismas in distinction from the Spring-tails, we will first consider. They are abundant in the Middle States under stones and leaves in forests, and northward are common in damp houses, while one beau-

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*Nicolet, in the "Annales de la Societe Entomologique de France" (tome v, 1847), has given us the most comprehensive essay on the group, though Latreille had previously published an important essay, "De l'Organization Exterieure des Thysanoures" in the "Nouvelles Annales du Museum d'Histoire Naturelle Paris, 1832," which I have not seen. Gervais has also given a useful account of them in the third volume of "Apteres" of Roret's Suite a Buffon, published in 1844.

The Abbe Bourlet, Templeton, Westwood, and Haliday have published important papers on the Thysanura; and Meinert, a Danish naturalist, and Olfers, a German anatomist, have published important papers on the anatomy of the group. In this country Say and Fitch have described less than a dozen species, and the writer has described a new species of Campodea, while Humbert has described in a French scientific journal a species of Japyx (*J. Saussurii*) from Mexico.